

### **REMARKS/AGRUMENTS**

Reconsideration of this application, as amended, is respectfully requested. The following remarks are responsive to the Office Action mailed March 11, 2004.

Claims 1-27 are pending.

Claims 1-8, 10-17, and 19-26 stand rejected.

Claims 9, 18, and 27 are objected to.

Claim 1 has been amended. It is respectfully submitted that no new matter has been added.

Claim 1 is rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter.

Claims 1 and 19 are rejected under 35 U.S.C. §102(a) as being anticipated by Duesterwald, et al., "Software Profiling for Hot Path Prediction: Less is More", ACM 2000. (hereafter, "Duesterwald").

Claims 1 and 19 are rejected under 35 U.S.C. §102(b) as being anticipated by Conte, et al., "Using Branch Handling Hardware to Support Profile-Driven Optimization", ACM 1994. (hereafter "Conte").

Claims 1-8, 10-17, and 19-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wu et al., "An Efficient Software-Hardware Collaborative Profiling Technique for Wide-Issue Processors," October 1999 (hereafter, "Wu") in view of Conte.

### **CLAIM REJECTIONS**

#### **35 USC §101**

The Examiner rejected claim 1 under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claim 1 has been amended to recite the feature of repeatedly performing edge profiling on a program *using hardware and software*. In light of the foregoing, applicant submits

that the amendments to claim 1 overcome the Examiner's rejection and respectfully requests that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. §101.

**35 USC §102 (a)**

The Examiner rejected Claims 1 and 19 under 35 U.S.C. §102(a) as being anticipated by Duesterwald. Applicant submits that claims 1 and 19 are not anticipated by Duesterwald. In regard to the rejection of claim 1, the Examiner has stated in part that:

Duesterwald discloses "A method comprising: performing repeatedly edge profiling on a program; detecting profile phase transitions repeatedly(Re: Duesterwald: See page 204, §3. and also see p. 210, §6.1); and optimizing the program based upon the profile phase transitions and edge profile..."  
(3/11/04, Office Action, pp. 3-4)

Applicant respectfully submits that claims 1 and 19 are not anticipated by Duesterwald. Claim 1 recites the feature of *performing repeatedly edge profiling on a program using hardware and software....* (Emphasis added) This feature is not disclosed by Duesterwald. Duesterwald uses an all software approach to perform path profiling. Infact, Duesterwald states "we delivered a new low-overhead software profiling scheme for hot path prediction. (Duesterwald, p. 202, abstract) Duesterwald discusses the shortcomings of prior hardware schemes and the benefits of her software scheme. More particularly, she sates "a straitforward approach to implement an online prediction scheme in **software** is to adapt an existing offline path profiling scheme...." (Duesterwald, p. 203, §1) Furthermore, Duesterwald does not describe *directly measuring branch execution frequencies over an entire execution of the program*, as claimed by applicant. Particularly, Duesterwald describes software profiling for hot path prediction. (Duesterwald, title) Additionally, Duesterwald states "the goal of hotpath prediction is to predict what will be one of the most frequently executing paths based on a limited amount of execution history." (Duesterwald, p. 204, §3) Thus, Duesterwald ultimately predicts which paths will be most frequently executed based on the limited execution history gathered during the period required to reach the hotpath threshold execution value. For at least these reasons, Duesterwald does not

disclose “*performing repeatedly edge profiling on a program using hardware and software, including directly measuring branch execution frequencies over an entire execution of the program*” as stated in applicant’s claim 1. (emphasis added) Because, Duesterwald does not disclose this feature taught by applicant’s claim 1, applicant respectfully submits that claims 1 and claims 2-5 which depend from claim 1 are not anticipated under 35 U.S.C. §102(a) by Duesterwald.

The Examiner also rejected in claim 19 under 35 U.S.C. §102(a) for the reasons set forth in the rejection of claim 1. Claim 19 discloses substantially similar features as claim 1, and recites *performing repeatedly edge profiling on a program over an entire execution of the program*. (Emphasis added) Because, Duesterwald does not disclose this feature as taught by applicant for the reasons discussed above with regard to claim 1, applicant respectfully submits that claim 19 and claims 20-27 which depend from claim 19 are not anticipated under 35 U.S.C. §102(a) by Duesterwald.

### **35 USC §102 (b)**

The Examiner rejected claims 1 and 19 under 35 U.S.C. §102(b) as being anticipated by Conte. Applicant submits that claims 1 and 19 are not anticipated by Conte. In regard to the rejection of claim 1, the Examiner has stated in part that:

Conte discloses “A method comprising: performing repeatedly edge profiling on a program; detecting profile phase transitions repeatedly(Re: Conte: See page 204, §3. and also see p. 210, §6.1); and optimizing the program based upon the profile phase transitions and edge profile...”  
(3/11/04, Office Action, p. 4)

Applicant respectfully submits that claims 1 and 19 are not anticipated by Conte. Claim 1 recites the feature of *detecting profile phase transitions repeatedly*. (Emphasis added) This feature is not disclosed by Conte. Conte describes a method for obtaining profile information without significant run-time slow-down. (Conte, pp. 12-13). Conte discusses several hardware

branch prediction mechanisms. The goal of Conte's paper is to demonstrate that the contents of hardware branch buffers can be used to add weights to a statically – built control flow graph (CFG). (Conte, p.14, § 3) The weights indicate which traces are analyzed. (Conte, p.16, § 3.4). Conte's **Figure 4** shows a comparison of "actual profiles" to "estimated profiles". The comparison results in certainty values, such as the percentage probability that the estimated profiles are correct. The only use of Conte's **Figure 4** is to validate the use of estimated profiles. The transition from block 7 to 8 shown in **Figure 4** and described at page 16, §3.4 describes transitions between blocks along an execution path, not phase transitions. For at least these reasons, Conte does not disclose *detecting profile phase transitions repeatedly* as stated in applicant's claim 1. (emphasis added) Because, Conte does not disclose this feature taught by applicant's claim 1, applicant respectfully submits that claims 1 and claims 2-5 which depend from claim 1 are not anticipated under 35 U.S.C. §102(b) by Conte.

The Examiner also rejected in claim 19 under 35 U.S.C. §102(b) for the reasons set forth in the rejection of claim 1. Claim 19 discloses substantially similar features as claim 1, and recites *detecting profile phase transitions repeatedly*. (Emphasis added) Because, Conte does not disclose this feature as taught by applicant for the reasons discussed above with regard to claim 1, applicant respectfully submits that claim 19 and claims 20-27 which depend from claim 19 are not anticipated under 35 U.S.C. §102(b) by Conte.

#### **CLAIM REJECTIONS – 35 USC §103 (a)**

The Examiner has rejected claims 1-8, 10-17, and 19-26 under 35 U.S.C. §103(a) as being unpatentable over Wu in view of Conte.

In regard to the rejection of claims 1-8 under 35 U.S.C. §103(a), the Examiner has stated in part that:

Wu does not particularly address *phase transitions*, but ... Conte discloses *detecting profile phase transitions repeatedly* by using graph weights... For example Conte calculates the occurring transition at block 7 and block 8....

(3/11/04 Office Action, p. 5).

Applicants respectfully disagree. Applicants submit that claims 1-8, 10-17, and 19-26 are not obvious in view of Wu and Conte. It is respectfully submitted that it would be impermissible hindsight, based on applicant's own disclosure, to combine Wu and Conte.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

However, nowhere is there any indication that the references provide any motivation for the recited combination. Instead, it appears the teachings of the present application have been used as a blueprint to gather together and assemble various components of the prior art in the manner contemplated by applicants. This is a classic example of the use of hindsight reconstruction, and cannot properly be used as grounds for rejecting the present claims.

The U.S. Court of Appeals for the Federal Circuit has strongly criticized such applications of hindsight by specifically indicating that when an obviousness determination is made based upon a combination of references, even a patent examiner "must show reasons that the skilled artisan, confronted with the same problems as the inventor *and with no knowledge of the claimed invention*, would select the elements from the cited prior art references for combination in the manner claimed." *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) (Emphasis added). Merely indicating, as the Examiner argues in his Office Action, that the claimed invention would be obvious to one of ordinary skill in the art based on the combination of the references is utterly inadequate. *Rouffet*, at 1357. Instead, what is needed is a showing of motivation, either from the references themselves or the knowledge of those of ordinary skill in the art, for the combination being relied upon. *Rouffet*, at 1357.

In the present case, there has been no showing of such motivation. Instead, the Examiner attempts to deconstruct the subject matter of the claims of the present application into its constituent components, states where each such component may be found in one of the cited references, and then concludes that it would have been obvious to combine the references to arrive at the claimed invention. This bare bones analysis is not sufficient to support a determination of obviousness of the present application. The burden is on the Examiner to show *why* one is so motivated as to come up with the combination being relied upon. *Rouffet*, at 1357-1358 ("If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields [an infringer or the Patent Office] could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for [obviousness]. To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.")

In regard to the rejection of claims 8-9, even if Wu and Conte were combined, such a combination would lack one or more features of claim 1. Amended claim 1 recites the feature of detecting profile phase transitions repeatedly. (emphasis added) As the Examiner states, this feature is not disclosed by Wu.

Nor does Conte disclose "detecting profile phase transitions continuously" for the reasons discussed above in the rejection of claim 1 under 35 U.S.C. §102(b). The weights indicate which traces are analyzed. (Conte, p.16, § 3.4) The transition at block 7 and block 8 described in Conte and cited by the Examiner, simply indicates the probability that a particular path from block 7 to block 8 will be executed. Determining the execution probability of a block as described in Conte, is not detecting a profile phase transition as claimed by the applicant. Thus, because neither, Wu nor Conte disclose applicant's claim 1, applicant respectfully submits that claim 1 is not obvious

under 35 U.S.C. §103(a) by Wu in view of Conte. Given that claims 2-9 depend from claim 1, applicants respectfully submit that claims 1-9 are not obvious under 35 U.S.C. §103(a).

The Examiner also rejected claims 10-17 under 35 U.S.C. §103(a) for the reasons set forth in the rejection of claims 1-8. Claim 10, from which claim 17-18 depend, discloses substantially similar limitations as claim 1 and recites the system detects profile phase transitions repeatedly. Because Wu, in view of Conte, does not disclose this feature and given that claims 11-18 depend from claim 10, applicants respectfully submit that claims 10-18 are not obvious under 35 U.S.C. §103(a) by Wu, in view of Conte.

The Examiner also rejected claims 19-26 under 35 U.S.C. §103(a) for the reasons set forth in the rejection of claim 1-8. Claim 19 discloses substantially similar limitations as claim 1 and recites detecting profile phase transitions repeatedly. Because Wu, in view of Conte, does not disclose this feature and given that claims 20-27 depend from claim 19, applicant respectfully submits that claims 19-27 are not obvious under 35 U.S.C. §103(a) by Wu, in view of Conte.

### **CONCLUSION**

In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (408) 947-8200.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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Date: July 9, 2004

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